REMARKS

Claims 1 to 20, as amended, appear in this application for the Examiner's review and consideration. The amendments to the claims are fully supported by the specification and claims as originally filed. In particular, support for the recitation of "introducing a carrier gas carrying an organic material for deposition into a nozzle" in the claims can be found on pages 6 to 8 of the present specification. Therefore, there is no issue of new matter. In addition, the amendments to the independent claims add recitations that elaborate on the structure of the presently claimed invention, and, thus, do not affect the scope of the claims. The amendments only further clarify the claimed invention.

Claims 1 to 3, 10, 14 to 18, and 20 were rejected under 35 U.S.C. §103(a), as allegedly being unpatentable over U.S. Patent No. 4,7887,082 to Schmitt in view of Stickney et al., "Angular Distribution of Flow from Orifices and Tubes at high Knudsen Number," J. Fac. Sci. and Tech., 4, 10-17 (1967) (Stickney) for the reasons set forth on pages 5 and 6 of the Office Action; claims 4, 5, 6, 9, 11 and 12 were rejected under 35 U.S.C. §103(a), as allegedly being unpatentable over Schmitt in view of Stickney and further in view of U.S. Patent No. 6,498,605 to Shah et al. (Shah) for the reasons set forth on pages 6 to 8 of the Office Action; claims 7 and 8 were rejected under 35 U.S.C. §103(a), as allegedly being unpatentable over Schmitt in view of Stickney and Shah and further in view of Kirk-Othmer, Encyclopedia of Chemical Technology, Fourth Ed., Vol. 24, "Vacuum Technology," 750-53 (1997) (Kirk-Othmer) for the reasons set forth on page 8 of the Office Action; and claims 13 and 19 were rejected under 35 U.S.C. §103(a), as allegedly being unpatentable over Schmitt in view of Stickney and Shah and further in view of U.S. patent No. 5, 709,906 to Bickford et al. (Bickford) for the reasons set forth on pages 8 and 9 of the Office Action.

In response, Applicants submit that the presently claimed invention is directed to a method of depositing an organic material. The claimed method, as recited in claim 1, comprises introducing a carrier gas carrying an organic material for deposition into a nozzle, ejecting the carrier gas carrying the organic material from the nozzle at a flow velocity that is at least 10 percent of the thermal velocity of the carrier gas, such that the organic material introduced into the nozzle is deposited onto a substrate, separated from the nozzle. A region between the nozzle and the substrate surrounding the carrier gas has a dynamic pressure of at least 1 Torr, and at least one of the nozzle diameter, the nozzle length, and nozzle-to-substrate separation is about equal to the gas mean free path length. The recitation of claim 11 differs

from that of claim 1, in that claim 11 recites providing a guard flow, but does not recite a dynamic pressure of 1 Torr.

Therefore, to be within the scope of the present claims, a reference must disclose or suggest introducing a carrier gas carrying an organic material for deposition into a nozzle, and ejecting the carrier gas carrying the organic material from the nozzle, such that the organic material introduced into the nozzle is deposited onto a substrate, where at least one of the nozzle diameter, nozzle length, and/or nozzle-to-substrate separation is about equal to the mean free path of the gas.

In contrast to the presently claimed invention, all of the embodiments disclosed by Schmitt require at least one of:

1. Mixing the material for deposition with the carrier gas in the nozzle of the disclosed apparatus;

2. Forming the material for deposition from reactive spices in the disclosed nozzle; or

3. Forming the material for deposition from reactive species after ejection of the carrier gas and reactive species from the disclosed nozzle.

Schmitt does not disclose or suggest introducing a carrier gas carrying an organic molecule for deposition into a nozzle, and then ejecting the carrier gas carrying the organic material for deposition from the nozzle, as presently claimed.

The only disclosure of organic molecules by Schmitt is that at column 30, lines 21 to 38, as cited in the Office Action at page 5. Schmitt discloses that an organic material in bulk form may be heated to evaporate in a nozzle, so they may be and convected by an inert carrier gas flow, as illustrated in Fig. 5. Column 30, lines 22 to 25, and Fig. 5. Alternately, Schmitt discloses that monomers may be synthesized in the gas phase, and allowed to polymerize during transport in the jet to the substrate, using the mechanism illustrated in Figs. 4 and 6, such that the polymerization occurs within the nozzle or after ejection from the nozzle. Column 30, lines 29 to 35, and Figs. 4 and 6.

In the apparatus and method illustrated in Fig. 5, a carrier gas 1-3 is introduced into a nozzle 1-1 through an inlet 1-6. Column 3, lines 13, 14, and 34 to 40. The solid or liquid material for deposition 5-1, represented by the large open circle in Fig. 5, is held in place in the flowfield in the nozzle, and heated to evaporate or sublime molecules that are entrained in the flow of carrier gas through the nozzle. Column 3, lines 40-48.

In the apparatus and method illustrated in Fig. 4, precursor molecules are premixed with the carrier gas upstream of the inlet to the nozzle. Column 3, lines 30 to 33. In the apparatus and method illustrated in Fig. 6, reactant species 6-1 in the gaseous or liquid phase

are introduced in to the carrier gas flow 1-3 in the jet via a thin tub 6-2, which exits in region R1 of the flow at the nozzle exit region. Column 3, lines 8 to 10 and 49 to 57, and Figs. 1, 3 and 6. That is, Schmitt discloses that region R1 as that portion of the flow region that is in and around the nozzle exit.

As illustrated in Fig. 4, precursor molecules mixed with the carrier gas are introduced into region R1, and then acted upon to synthesize a condensable species. Column 9, lines 44 to 51. As illustrated in Fig. 5, the precursor species is held in place directly in the gas flow 1-3 in nozzle 1-1 at region R1. Column 9, lines 58 to 67. As illustrated in Fig. 6, reactant species are injected by a thin tube 6-2 into the flow region R1, where they are entrained in the flow of the carrier gas 1-3 in the nozzle 1-1. Column 9, line 67, to column 10, line 2.

Schmitt clearly teaches that one of the main advantages of the disclosed apparatus and methods is that premature condensation of the deposition material is avoided. See column 7, lines 39 to 43, column 8, lines 23 to 36, column 9, lines 24 to 28 and 34 to 37, and column 16, lines 9 to 18. Deposition on the nozzle is avoided by the synthesis of the depositing species near the center of the jet in region R1, such that there is no time for diffusion of those species to the walls of the apparatus. Column 8, lines 22 to 27. The depositing species are ejected from the nozzle to the substrate before deposition on the apparatus can occur.

Therefore, one of ordinary skill in the art following the teaching of Schmitt would not introduce a carrier gas carrying an organic material for deposition into a nozzle, as Schmitt discloses that the depositing species must be introduced into the carrier gas in flow region R1 of the nozzle to prevent deposition of the depositing species on the walls of the apparatus. Accordingly, one of ordinary skill in the art would not modify the method disclosed by Schmitt to obtain the presently claimed method.

Stickney does nothing to overcome the deficiencies of Schmitt. Stickney discloses an investigation of the flow of cesium atoms from orifices and tubes into vacuum. *See* the abstract. Particular attention was given to the mean-free molecule flow regime, where the Knudsen number, defined as λ/D, the ratio of the mean-free path and the orifice or tube diameter, is on the order of unity. Page 10, first paragraph. As will be understood by one of ordinary skill in the art, the free molecule flow regime is the regime in which there are few if any molecular collisions in the flow. This is exactly the opposite of what is required in the processes disclosed by Schmitt.

Stickney does not disclose or suggest introducing a carrier gas carrying an organic material for deposition into a nozzle, and ejecting the carrier gas carrying the organic material from the nozzle at a flow velocity that is at least 10 percent of the thermal velocity of the

carrier gas, such that the organic material introduced into the nozzle is deposited onto a substrate, as presently claimed. Even if one of ordinary skill in the art combined the disclosures of Schmitt and Stickney, the resulting combination would not provide the presently claimed invention.

Moreover, as discussed above, one of ordinary skill in the art following the disclosure of Schmitt would not modify the method disclosed by Schmitt to introduce a carrier gas carrying an organic material for deposition into a nozzle, and eject the carrier gas carrying the organic material from the nozzle at a flow velocity that is at least 10 percent of the thermal velocity of the carrier gas, such that the organic material introduced into the nozzle is deposited onto a substrate, as presently claimed. Schmitt discloses that the depositing species must be introduced near the nozzle exit to avoid condensation on the walls of the apparatus. Therefore, Schmitt and Stickney do not disclose or suggest the presently claimed invention.

Shah does nothing to overcome the deficiencies of Schmitt and Stickney. Shah discloses a deposition process for coating a substrate with an ultrasonically generated aerosol spray. Column 1, lines 16 to 18. Shah discloses that a shroud gas may be used to screen and shape the aerosol spray. Column 3, line 52, to column 4, line 6.

Shah does not disclose or suggest introducing a carrier gas carrying an organic material for deposition into a nozzle, and ejecting the carrier gas carrying the organic material from the nozzle at a flow velocity that is at least 10 percent of the thermal velocity of the carrier gas, such that the organic material introduced into the nozzle is deposited onto a substrate, as presently claimed. Therefore, even if the disclosure of Shah was combined with that of Schmitt and Stickney, the combination would not provide the presently claimed invention. Therefore, those references do not disclose or suggest the presently claimed invention.

Kirk-Othemer does nothing to overcome the deficiencies of Schmitt, Stickney, and Shah. Kirk-Othmer is an Encyclopedia of Chemical Technology that discloses that a pressure of less than 0.1 Torr is possible with vacuum technology. Kirk-Othmer does not disclose or suggest introducing a carrier gas carrying an organic material for deposition into a nozzle, and ejecting the carrier gas carrying the organic material from the nozzle at a flow velocity that is at least 10 percent of the thermal velocity of the carrier gas, such that the organic material introduced into the nozzle is deposited onto a substrate, as presently claimed. Even if one of ordinary skill in the art combined the disclosures of Kirk-Othmer with those of the other cited references, the resulting combination would not provide the presently claimed invention.

Bickford does nothing to overcome the deficiencies of Schmitt, Stickney, and Shah. Bickford discloses a method of conditioning halogenated polymeric materials, where the method may be performed in a glove box that may be purged with an inert gas. Bickford does not disclose or suggest introducing a carrier gas carrying an organic material for deposition into a nozzle, and ejecting the carrier gas carrying the organic material from the nozzle at a flow velocity that is at least 10 percent of the thermal velocity of the carrier gas, such that the organic material introduced into the nozzle is deposited onto a substrate, as presently claimed. Even if one of ordinary skill in the art combined the teaching of Bickford with those of the other cited references, the resulting combination would not provide the presently claimed invention.

Therefore, as Schmitt, Stickney, Shah, and Kirk-Othmer, whether taken alone or in combination do not disclose or suggest the presently claimed invention, the present claims are not obvious over those references. Accordingly, it is respectfully requested that the Examiner withdraw the rejections of the claims over those references under 35 U.S.C. § 103(a).

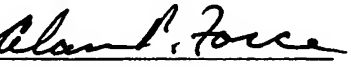
Applicants thus submit that the entire application is now in condition for allowance, an early notice of which would be appreciated. Should the Examiner not agree with Applicants' position, a personal or telephonic interview is respectfully requested to discuss any remaining issues prior to the issuance of a further Office Action, and to expedite the allowance of the application.

An Extension-of-Time Transmittal is submitted herewith. Should any other fees be due, please charge such fees to Deposit Account No. 11-0600.

Respectfully submitted,

KENYON & KENYON LLP

Dated: December 12, 2006

By: 

Alan P. Force
Reg. No. 39,673
One Broadway
New York, NY 10004
(212) 425-7200